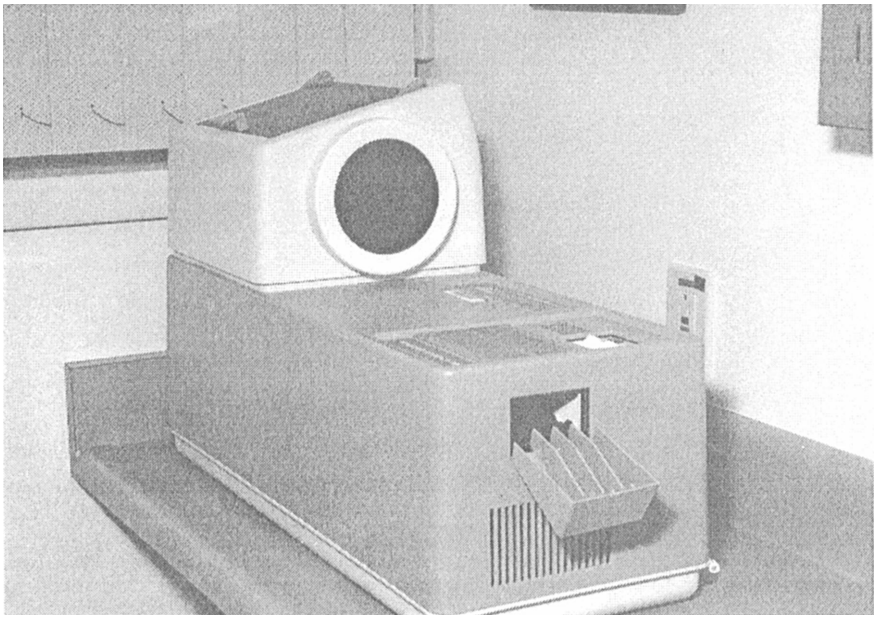


Figure 1-48.—Small automatic processor.

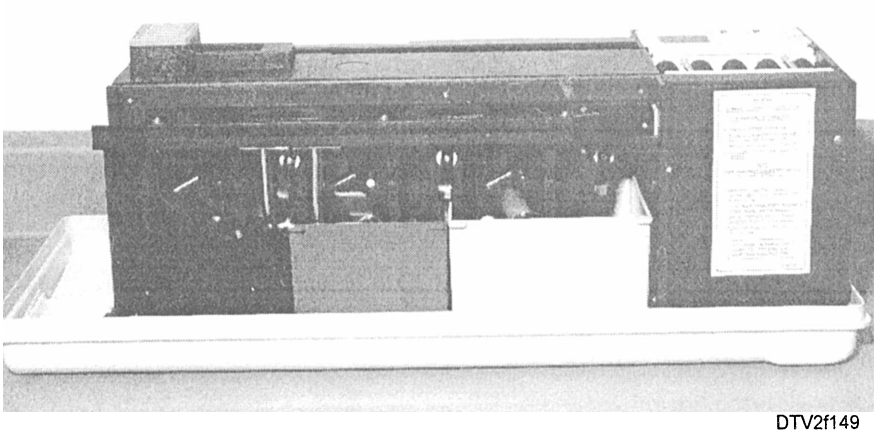


Figure 1-49.—Solution tanks.

Securing The Processor

Turn off the power switch (left) and unplug power supply cable from outlet.

Chemistry Change

Change the developer and fixer every 300 to 350 films or in 2 weeks, whichever is sooner. The water in the wash tank is changed every 100 to 125 films or in 1 week, whichever is sooner. When changing chemicals, clean the tanks with water and dry prior to placing new chemicals in them. Use the same safety precautions as mentioned before when handling chemicals.

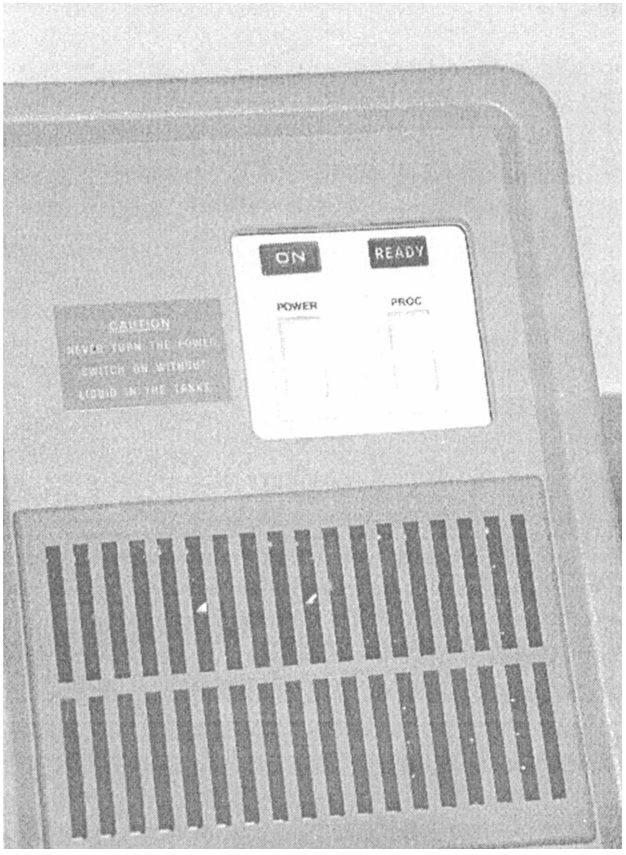
Maintenance Schedule

Daily, wipe the external parts of the processor with a dry or slightly moist, lint free cloth. Refer to the instruction manual for the complete maintenance schedule.

FAULTY RADIOGRAPHS

Faulty radiographs are usually caused by the incorrect positioning of the film packet or the tube head; incorrect kVp, mA and time setting; or by incorrect processing procedures.

Some common causes of faulty radiographs due to tube head and film misalignment have already been

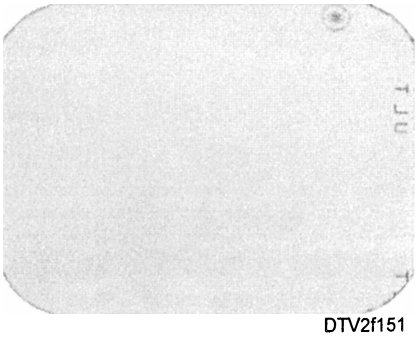


DTV2f150

Figure 1-50.—Operator control panel.

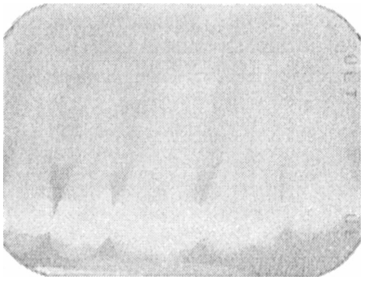
discussed (e.g., incorrect horizontal angulation produces superimposed radiographic images, and incorrect vertical angulation produces images that may be foreshortened or elongated.) The following are additional causes of faulty radiographs:

- No image (fig. 1-51): The film was immersed in the fixer before the developer. If the film is completely clear, it was never exposed.
- Very light image (fig. 1-52): The film was underexposed (kilovoltage too low); the developer was weak; or the film was not left in the developer long enough.
- Very dark image: The film was over-exposed (kilovoltage too high); the developer was too warm; or the film was left in the developer too long.
- Partial image (fig. 1-53): The film was not completely immersed in the developer; the film came into contact with other film or the side of the tank while in the developer; or the film or tube head was incorrectly positioned (cone cutting).
- Blurred image: The patient or tube head moved during the exposure.
- Fogged film: The film was outdated or contaminated; the film was overexposed by being held too close to the safelight; the film was exposed to stray radiation, excessive heat, chemical fumes, or lightleaks in the darkroom; the developer was improperly mixed, contaminated, or too hot.
- Streaked or stained film: The film was insufficiently washed or fixed; the processing solutions were dirty; or the film hanger was dirty.



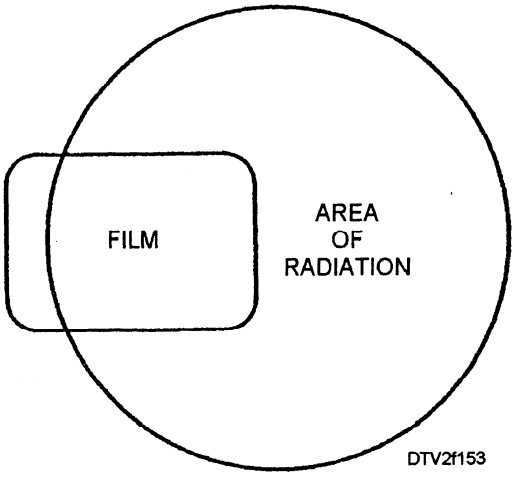
DTV2f151

Figure 1-51.—No image.



DTV2f152

Figure 1-52.—Very light image.



DTV2f153

Figure 1-53.—Partial image (cone cutting).

- Reticulation: There was a too rapid change in temperature during processing (e.g., the film was taken from a warm developer to a cold rinse).

- Crescent-shaped lines (fig. 1-54): The film packet was creased or bent.

- Herringbone image (fig. 1-55): The wrong side of the film, packet was facing the source of the X-ray beam during exposure causing the embossing pattern from the lead backing to appear on the film.

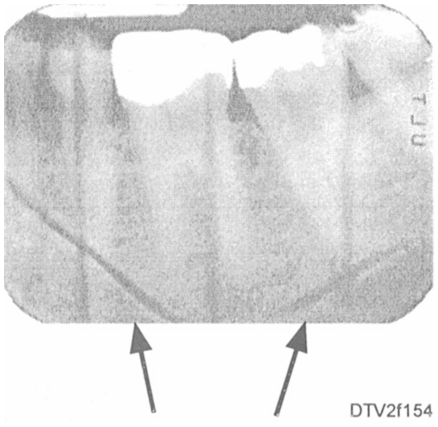


Figure 1-54.—Crescent-shaped lines on film.

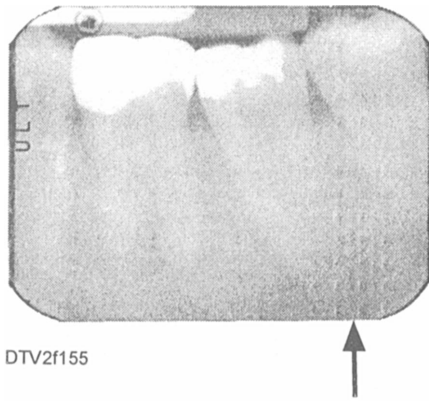


Figure 1-55.—Herringbone image.

- Black areas: The film was pulled too rapidly from its black paper wrapping, causing a discharge of static electricity.

- White spots: The developer failed to work on these areas because of dirt or air bubbles.

- Foreign object image (fig. 1-56): Dentures or other objects were in the patient's mouth during the exposure.

FILM VIEWERS

The film viewer consists of a metal case with a back-lighted screen. The viewer is used to mount and examine radiographs. Figure 1-57 shows a typical desk mount film viewer. Never light the film viewer in the darkroom when you are working with unwrapped, unprocessed film. Keep the viewer screen clean at all times.

MOUNTING RADIOGRAPHS

After processing the X-ray film, you will mount the finished radiographs in cardboard or plastic holders. Mounting makes the radiographs easy to view, keeps them in a chronological order, and protects them from damage.

Mounted radiographs may be viewed from either the front or back of the mount. If viewed from the front, the teeth appear on the film as if you were looking directly into the patient's mouth. If viewed from the back, the teeth appear on the film as if you were sitting on the patient's tongue looking out. Always mount X-rays in anatomical order. After you mount the radiographs, file the mount in the patient's Dental Record. There will be times when the dental officer will want to retain the radiographs for diagnostic purposes (e.g., endodontics). These are normally placed in a drug envelope, labeled and dated, and placed in the dental record.

Figure 1-56.—Foreign object image.

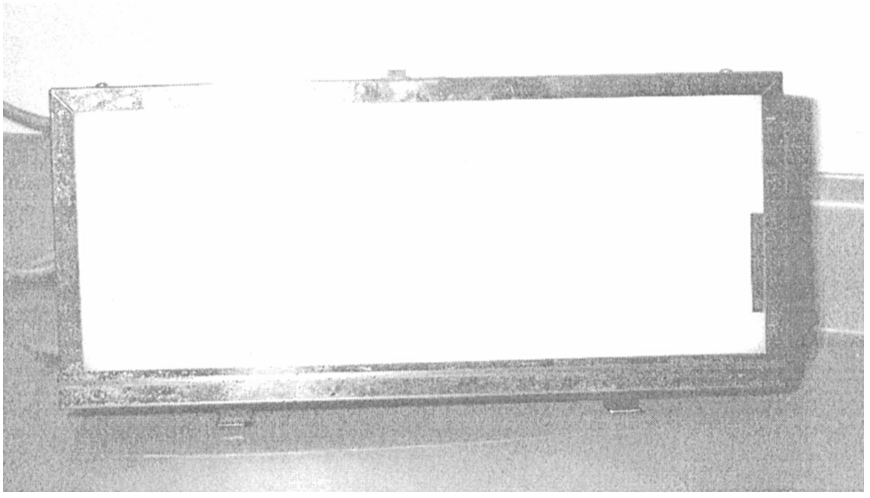


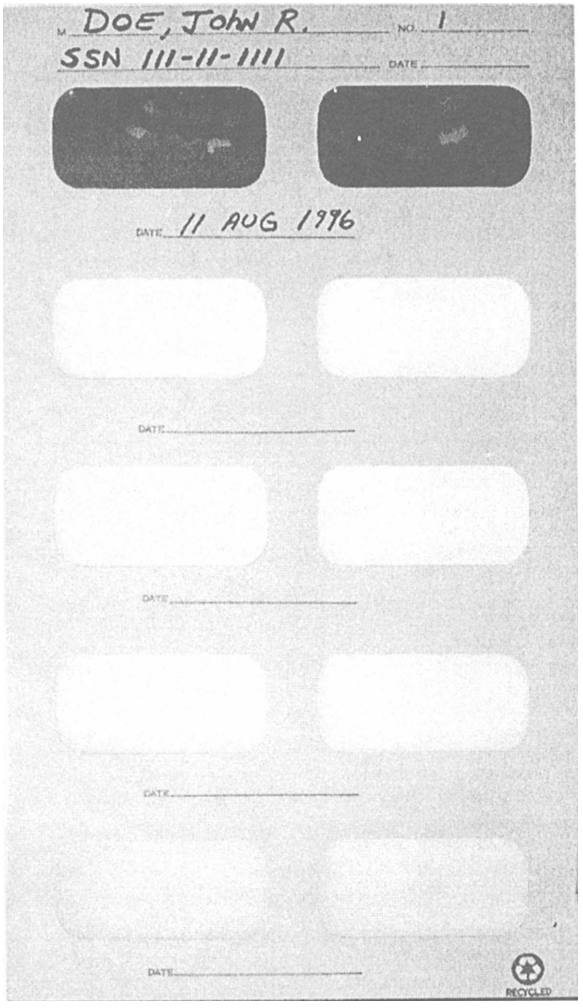
Figure 1-57.—Desk mount film viewer.

INTERPROXIMAL (BITE-WING) MOUNTING

Figure 1-58 shows a serial mount for inter-proximal (bite-wing) radiographs. The mount contains slots for mounting five pairs of interpromixal radiographs for a patient taken at different times and mounted in chronological order. Serial mounting enables the dental officer to compare radiographs taken at different time intervals to detect changes in the patient's oral structures.

The front of the mount contains spaces for the patient's name and social security number, mount number, and the date of each exposure. Fill in this information whenever you start a new mount. After you have completed the necessary information on the front side, turn the mount over and lay it face down on a table top.

Place the radiographs on a flat, dry surface with the convex surface of the identifying "dimple" toward the observer. Pick up a radiograph by the edges. Hold it up to the, film viewer. The line representing the occlusal surface of the bicuspids and molars should gradually curve upward, forming one-half of a smile. If the line curves upward on the right, slide the radiograph into the right-hand slot on the back of the mount with the upward curve toward the outside of the mount. Keep the raised dimple facing you. If the line curves upward on the left, slide the radiograph into the left-hand slot. If both radiographs are mounted correctly, they will appear as shown in figure 1-58, forming a complete smile. Each time an additional pair of inter-proximal radiographs is mounted, enter the date on the line beneath the mounting slots.



DTV2f158

Figure 1-58.—Interproximal (bitewing) serial mount.

FULL MOUTH PERIAPICAL MOUNTING

Figure 1-59 shows a full mouth periapical film mount. The mount contains 14 slots for periapical radiographs and 2 slots for interproximal (bite-wing) radiographs.

When mounting full mouth periapical radiographs, you will be working with 14 radiographs; take care to sort and mount them correctly. To do this, you must be able to recognize certain maxillary and mandibular anatomical landmarks.

ANATOMICAL LANDMARKS

During the following discussion, locate each anatomical landmark on figure 1-60. The landmarks are indicated by arrows.

Maxillary Incisor Area

Radiographs of this area usually show a large white region caused by the bone of the nasal septum (A in fig. 1-60).

Mandibular Incisor Area

Mandibular incisors are smaller than maxillary incisors. The mandibular incisor area has a network of tiny white lines around and below the roots (D in fig. 1-60).

Maxillary Cuspid and Bicuspid Areas

Radiographs of these areas usually show a distinct wavy white line above or near the apices of the teeth (B in fig. 1-60). The wavy white line identifies the floor of the maxillary sinus. This white line is not found in radiographs of the mandibular arch.

Mandibular Cuspid and Bicuspid Areas

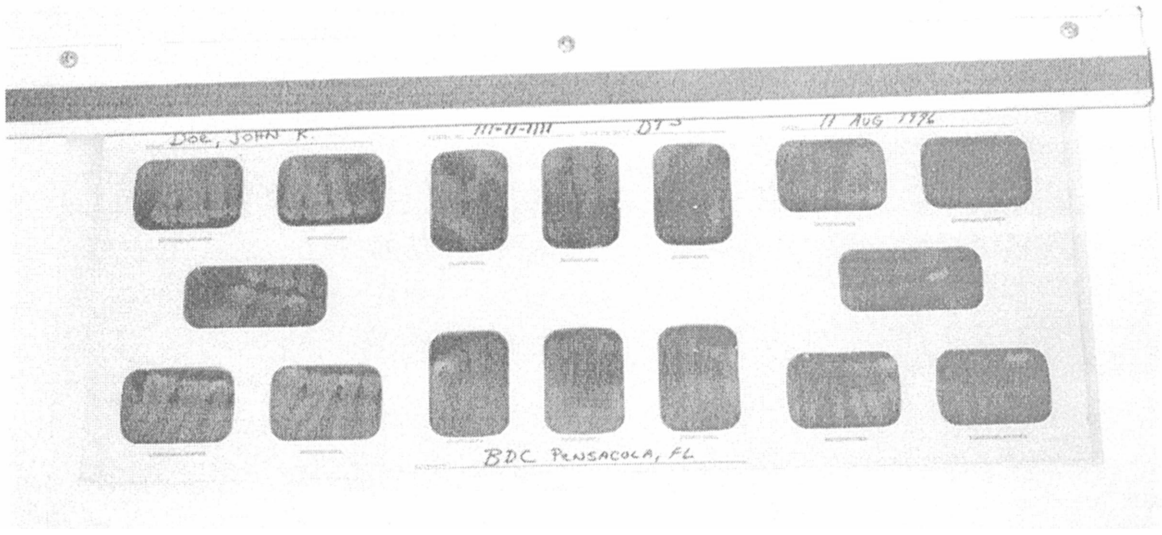
Radiographs of these areas show a fine network of tiny white lines around and below the roots and a dark area in the cuspid area representing the mental foramen (E in fig. 1-60).

Maxillary Molar Area

Radiographs of these areas show the maxillary arch and the roots of the maxillary molars curving slightly toward the rear of the mouth (C in fig. 1-60). Maxillary molars have three roots, they tend to be indistinct on radiographs. In addition, the radiographs will usually show a distinct wavy white line above or near the apexes of the teeth.

Mandibular Molar Area

Mandibular molars show two roots that are distinct on radiographs. The mandibular nerve canal frequently shows as a dark, narrow band running horizontally under the apexes of the mandibular molars. The mandibular arch and the roots of the molars curve slightly toward the rear of the mouth. An impacted third molar will often be present on radiographs of the mandibular molar areas (F in fig. 1-60).



DTV2f159

Figure 1-59.—Full mouth periapical mount.

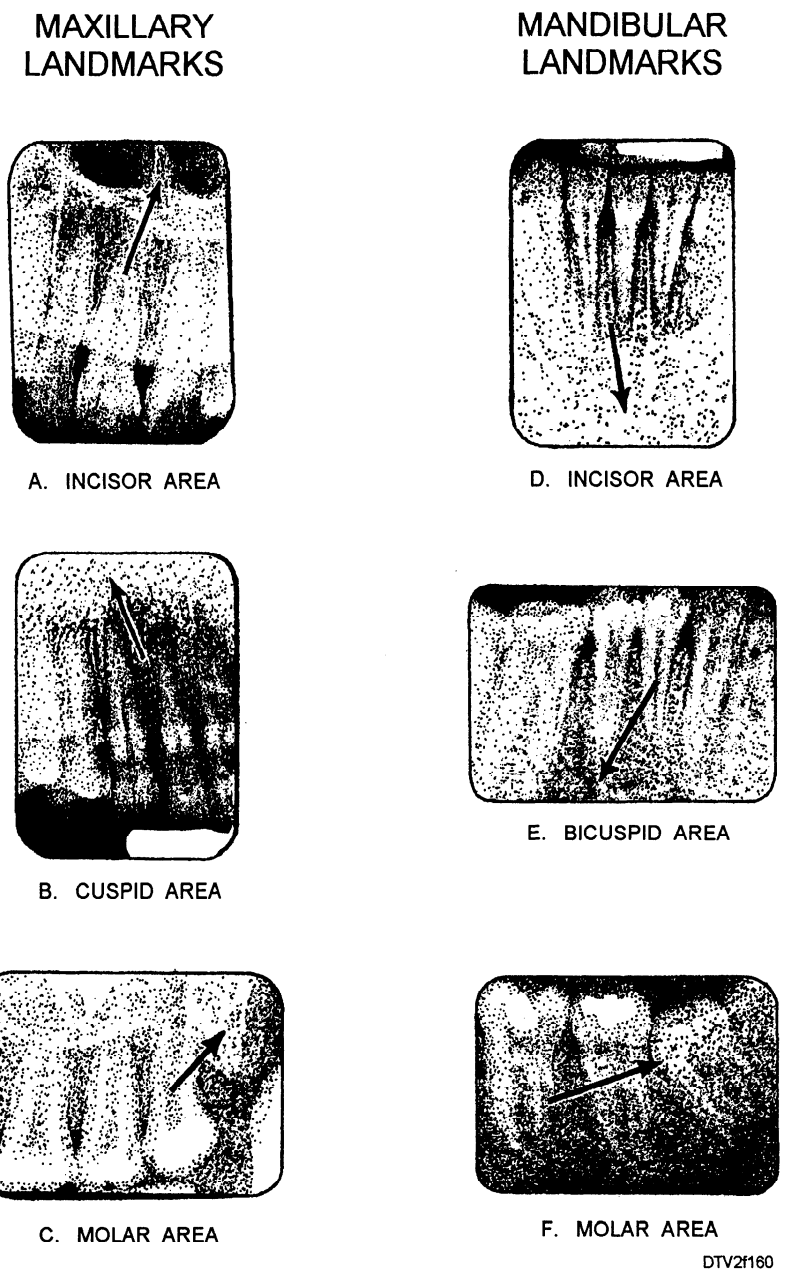


Figure 1-60.—Maxillary and mandibular radiographic landmarks.

MOUNTING PROCEDURES

Place all the radiographs in the full mouth periapical series on a dry, flat working surface with the dimple side up. On the front of the film mount, enter the patient's name, social security number, rank/rate, the date, and the name of the dental treatment facility. Place the mount face down on the working surface. The two small arrows on the back of the mount should point toward you. Follow these steps to mount the radiographs:

1. Check each radiograph and make sure that the surface with the raised dimple faces you.

2. Mount interproximal radiographs. If interproximal (bite-wing) radiographs are included in the full mouth series, insert them in the slots provided as previously discussed.

3. Divide the radiographs into maxillary and mandibular groups. Using the film viewer, locate the anatomical landmarks discussed earlier. The maxillary radiographs are inserted in the 7 slots across the top of the film mount and the mandibular radiographs in the 7 slots across the bottom.

4. Insert the maxillary radiographs. First, identify the radiograph of the central incisor area. Keeping the side with the raised dimple facing toward you, rotate the

radiograph until the incisal edges of the teeth point down. With the back of the mount toward you, slide the radiograph into the incisor slot. When the radiograph is properly mounted, the side with the raised dimple will face you, and the incisal edges pointing down toward the center of the mount.

5. Work outward from the central incisor slot, inserting the rest of the maxillary radiographs in the following order: cuspid areas, bicuspid areas, and molar areas.

6. Insert the mandibular radiographs. Start with the radiographs of the central incisor areas and work outward. As before, the raised dots will be toward you and the incisal/occlusal surfaces of the teeth should be pointing upward toward the center of the mount.

When you have inserted all of the radiographs, hold the mounted radiographs up to the viewer. Double check to see that each radiograph is mounted correctly.

PANORAMIC RADIOGRAPHS

The panoramic X-ray machine is used to produce an extraoral radiograph that shows both dental arches and the temporomandibular joints (fig. 1-61). The radiograph is made by rotating the tube head and film around the patient while the patient remains stationary. Because of the different manufacturers and models of panoramic X-ray machines used in the Navy, this operation and maintenance will vary. Always refer to manufacturer's instruction manual prior to use.

The panoramic X-ray machine and control panel are shown in figures 1-62 and 1-63. Refer to these figures throughout the following discussion. You must be thoroughly familiar with the components shown before operating the machine.

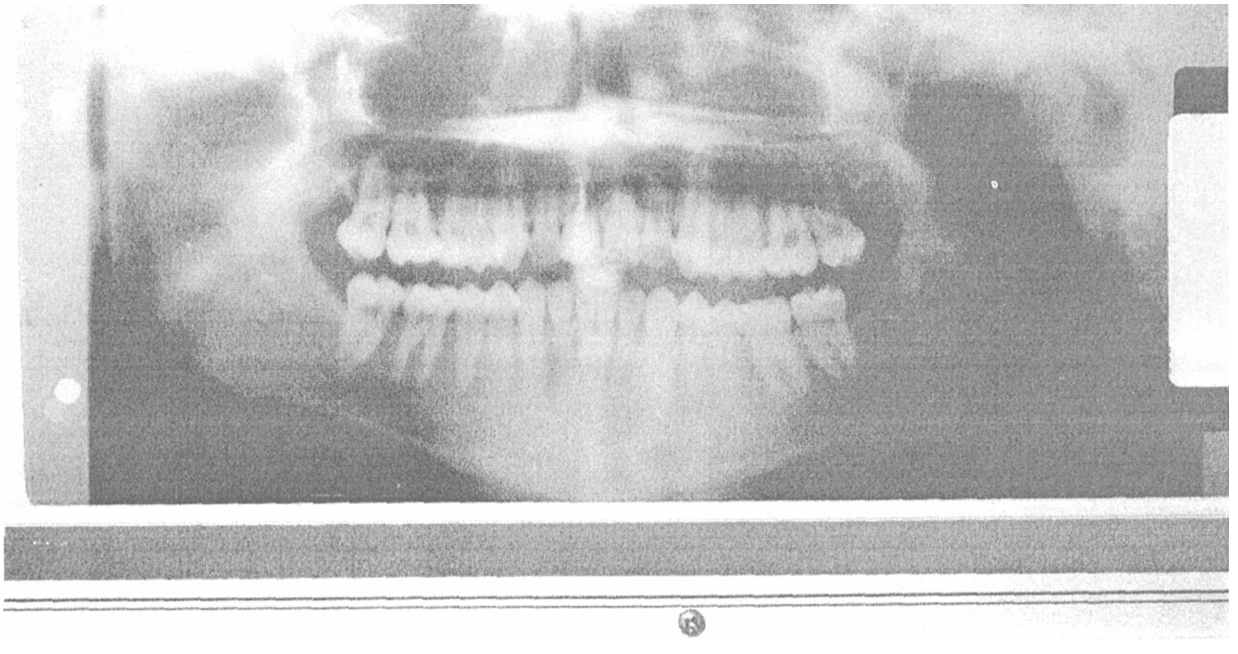
OPERATIONAL CHECK

The operational check for the panoramic X-ray machine is accomplished without a patient. To perform the operational readiness check, perform the following procedures as follows:

1. Turn on the pilot switch; the pilot light will illuminate.

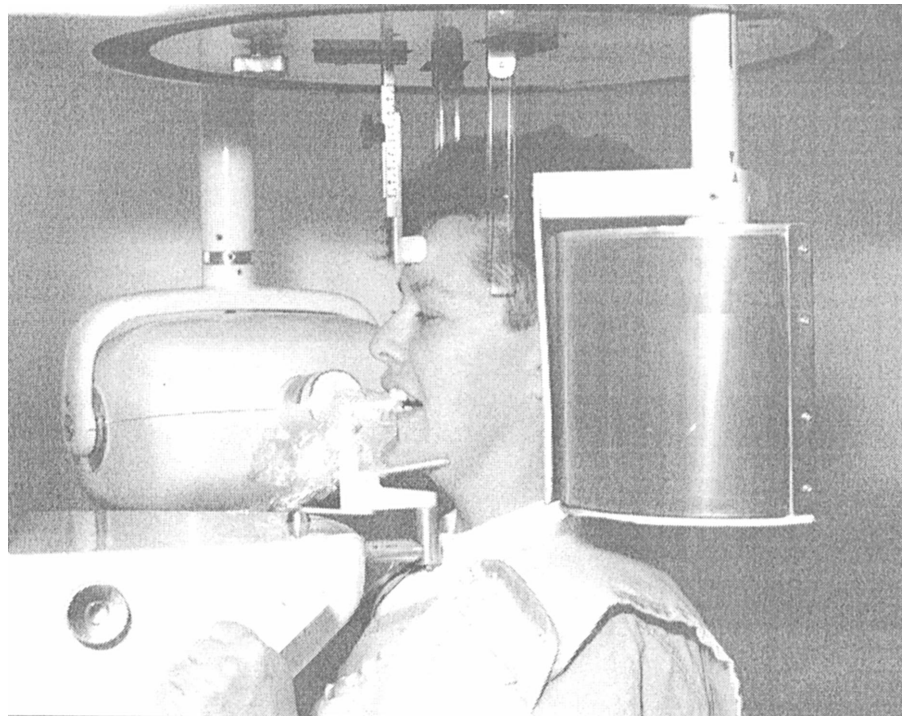
2. Set the kVp selector switch to the desired voltage. Adjust the kVp meter as a reference for the desired kVp setting.

3. Select the mA settings, to be used. Adjust them according to the manufacturer's instructions. When you find the mA and kVp settings that give the best results, enter them on a technique values chart. Remember each manufacturer's film is different, so follow the recommendations.



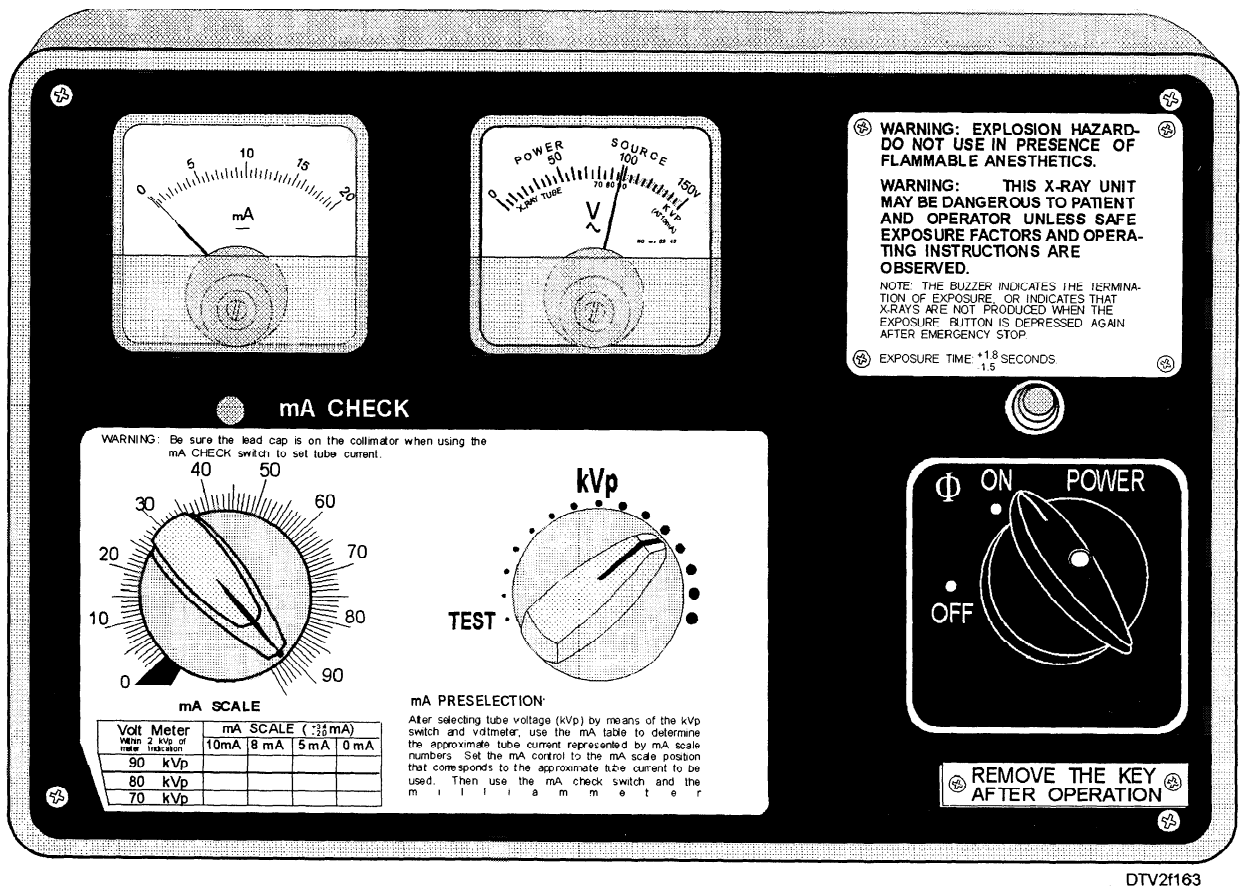
DTV2f161

Figure 1-61.—Typical panoramic radiograph.



DTV2f162

Figure 1-62.—A panoramic X-ray machine.



DTV2f163

Figure 1-63.—A panoramic control panel.

WARNING: When performing the operational check, keep the collimator covered with the lead cap.

PREPARING THE FILM

When the X-ray machine is operational, prepare the panoramic film. Load the film into a cassette drum, label it, and then mount it in the cassette drum assembly on the X-ray machine. To load and mount the cassette drum, follow the manufacturer's instructions.

LABELING THE CASSETTE

The cassette is labeled for the purposes of orientation and patient identification.

To properly orient the finished radiograph so you can distinguish the left from the right side of the patient's dentition, tape a lead letter "R" in the lower right-hand corner on the outside of the cassette cover.

There are two ways to label the cassette for patient identification. You can use a self-adhesive label or an X-ray film identification printer. Follow the manufacturer's instructions when using the printer. The patient information includes: the patient's name (last name, first name, and middle initial), family member prefix code, social security number, and the date of the exposure.

REQUIREMENTS FOR A GOOD PANORAMIC RESULT

Follow the manufacturer's operating instructions for complete operation of the panoramic X-ray machine before you attempt to use it. The following is a list of important procedures that must be followed to ensure a good quality X-ray is produced.

- Make sure patient's back and cervical spine are as straight as possible.
- Check that the patient's mid-sagittal plane is centered within the unit.
- Ensure the patient's frankfurt plane is horizontal.
- Check that the anterior maxillary and mandibular teeth are located on the indents of the bite-block. If the patient's bite is abnormal, adjust mandible forward or backward to compensate.
- Observe patient to assure there is no movement during the radiographic procedure.

OPERATING THE PANORAMIC-RAY MACHINE

With the machine operational and the film cassette drum in the cassette drum assembly, you are now ready to take the radiograph on the patient. Follow the manufacturer's instructions for patient positioning and operation. When the patient is positioned, explain the exposure procedures. Then make the exposure and process the film. You must wait 5 minutes between exposures to prevent overheating of the X-ray head.

USER MAINTENANCE

The panoramic X-ray machine requires very little user maintenance. Wipe the metal and painted parts with a soft, dry cloth daily.

Never attempt to repair the panoramic X-ray machine yourself. Report malfunctions to your supervisor. All repairs are the responsibility of the dental equipment repair technician.